

Using computer-tailored calendars to promote childhood immunization

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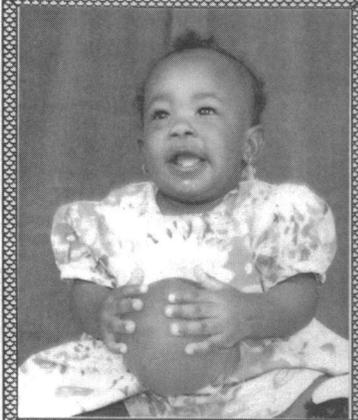
In many large U.S. cities, fewer than half of children ages two years and younger are fully immunized.¹ Lack of immunizations is especially common among children from families with lower incomes,²⁻⁵ single-parent families,² larger families,³ families with less educated parents² and minority families.⁵ Unfortunately, identification of high-risk populations has not always translated into unique or effective interventions for their members. Recent immunization guidelines suggest practitioners need to use more "patient-oriented" approaches⁶ and communicate more effectively with families and communities.⁷ These recommendations are consistent with principles of social marketing, which include having a consumer orientation and emphasizing the exchange of goods and services between providers and consumers.⁸ In practice, this means recognizing the value of parents' efforts to follow immunization schedules and providing incentives to encourage their continued compliance over time.

Guided by these principles, we developed a computer-tailored immunization promotion calendar and tested it among new mothers from two urban public health centers in St.

Baby Calendar for Nikki Whitfield

	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1993	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
1994	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

When you see this symbol, it's time for Nikki's next immunization shot. Call 522-6410 to make an appointment.



Nikki's Immunization Schedule

1993	1994
Aug. HBV	Feb. HBV, DTP, HbCV
Sept. HBV	Aug. MMR
Oct. DTP, OPV, HbCV	Nov. DTP, OPV, HbCV
Dec. DTP, OPV, HbCV	

HBV: Hepatitis B vaccine
 DTP: Diphtheria, tetanus, pertussis
 OPV: Polio
 HbCV: Hib Conjugate
 MMR: Measles, mumps, rubella

August...

...is Home Safety Month!

During the first years of her life, Nikki will be curious about people, her home, and everything around her. She will need you to protect her from harm. This month's calendar will give you ways to keep your home safe for Nikki.

August

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Time for Nikki's MMR shot...	...Call 522-6410 today to make an appointment!		Nikki is 12 months old today!			Keep sharp objects off your floor
7	8	9	10	11	12	13
		Praise Nikki for her actions			Don't let people smoke around Nikki!	
14	15	16	17	18	19	20
	Remember your WIC appointment this week!		Keep all cords out of Nikki's reach			Michael is 5 years old today!
21	22	23	24	25	26	27
Show Nikki shapes and colors		Always put Nikki in a child safety seat		Keep all your outlets covered		Sing to Nikki today
28	29	30	31			
	Keep Nikki away from stairways		Very hot bath water can hurt your baby			

Louis, MO, where the citywide immunization rate for preschool children is about 40%.¹ Mothers receiving tailored calendars were followed over a period of four months to assess short-term effects on their children's immunization rates.

Methods

Sample and study design. We invited parents with babies less than one year old from the pediatric clinics and WIC programs of two public health centers in St. Louis to participate. We

Table 1. Characteristics of study participants

Parent characteristics	Number (N=45)	Percent
Sex		
female	43	96
male	2	4
Age		
≤ 20 years	14	31
21–25 years	17	38
26–30 years	9	20
31+ years	5	11
Parity		
Age at first birth		
≤ 19 years	24	53
20–24 years	15	33
25+ years	6	13
Total children		
one child only	18	40
two children	15	33
three or more children	12	27
Public assistance		
enrolled in WIC program	44	98
receives food stamps	30	67
receives AFDC	26	58
Other indicators		
no automobile	21	47
no telephone	8	18
smoker living in household with child	19	42

enrolled 43 mothers and two fathers, each of whom completed a brief interview. During these interviews, we collected data needed to create the individualized calendars, including the names and birth dates of the parent(s), baby, and his or her siblings; the baby's most recent and future scheduled immunizations; future WIC appointments; and other characteristics of the baby's living environment that could influence his or her health (smokers living in household and ownership of: a smoke detector(s), telephone service, a car, and age-appropriate child safety restraints). A color photograph of each baby was also taken for use on the cal-

endar. Following the enrollment interviews, participants signed up for one of four focus group interviews to be held the following week. During the focus groups, each participant received two tailored monthly immunization calendars. Four months later, participants were interviewed and their babies' medical records reviewed to determine current immunization status.

Intervention. Computer tailoring is based up theories and empirical evidence suggesting that people pay more attention to personally relevant information.^{9,10} Studies have shown tailored materials to be more effective than (a) untailored materials or (b) health care without promotional materials in helping primary care patients quit smoking,¹¹ get cholesterol tests,¹² eat less fat,¹³ get mammograms,¹⁴ and change inaccurate perceptions of their stroke and cancer risks.¹⁵ There is some evidence suggesting tailoring may be most effective among poorer populations.¹⁴ Although the effects of tailored materials on childhood immunization have not been directly assessed, Yokley and Glenwich tested five immunization prompting interventions and concluded that client-specific prompts were the most cost effective and could substantially improve immunization rates.¹⁶

The tailored calendars created in this study specified the dates that future immunizations were due for that child; the dates of scheduled immunization or WIC appointments; the telephone number of the health center; the names and birthdays of the baby, his or her siblings, and the parent, and a color photograph of the baby. Calendar messages were written at a seventh grade reading level¹⁷ and included personalized age-specific recommendations for clinical preventive services and home safety¹⁸ and general parenting tips. Calendars were printed on brightly colored 11"x17" paper, and laminated for durability.

Attrition. Most interview participants (80%) attended a focus group and thus received a calendar. At the four month follow-up, a telephone interview with the parent or review of the baby's medical chart was obtained for 31 of 36 participants (86%). In 17 cases in which both interview and chart review were obtained, parents' reports of their child's immunization status matched medical records in all but one case (94% matching).

Findings

Participants. Most parents were female (96%), African American (67%), and young (31% were under age 21). A majority participated in several public assistance programs, 53% were teenage at the birth of their first child, and many had no car or telephone (see Table 1).

Follow-up assessment. Of the 31 participants completing a telephone interview at the four-month follow-up, all reported still having their calendars, 70% reported still having at least one calendar posted in their home, and 75% correctly identified within one month the date when their baby's next shots were due. Among those whose babies were due for shots during the four-month study period and for whom follow-up data were obtained (n=22), 91% had received shots at follow-up. We were unable to obtain follow-up data for five participants whose babies needed shots during the study period. Assuming none of these babies received their shots, compliance at follow-up would be 75%.

Discussion

We had observed that families in poverty, especially those with non-working parents and preschool-age children, often have no mechanism for differentiating one day from the next,

One mother told us that when her grandmother died, the family put one of the calendars in the casket.

which contributes to missed appointments. Tailored calendars may help families better organize and plan their time. Although we could not discern which elements of the calendar were most useful, comments from participants and public health center staff members suggest the color photograph was one of its essential features. Many participants had no professional photographs of their new baby and clearly valued the ones we provided. One mother told us during the follow-up interview that when her grandmother died, the family put one of the calendars in the casket so she'd always have a picture of her great-grandchild. If free studio-type photography motivates parents to have their children immunized, the small investment in a lighting set (\$1000), 35 mm camera (\$150), and cloth backdrop (\$25) is probably worthwhile for many public health centers.

The results of this pilot study should encourage practitioners to experiment with their own immunization calendars. In the near future, computer-based interventions like this one can be linked to population health data systems to reach large and disparate populations. Healthy People 2000, for example, calls for the development of data systems to monitor progress toward health objectives and

for use in program planning.¹⁹ Individual-level data from such systems can be used to create tailored materials such as immunization calendars. If these data systems indeed are commonly used in public health in the future, savvy practitioners will find ways to use data not just for planning programs and setting objectives but also to help individual patients.

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